Standard 5100-190b
September 1996
Superseding
Standard 5100-190a
December 1978

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

STANDARD FOR

THREADS, GASKETS, ROCKER LUGS, CONNECTIONS AND FITTINGS, FIRE HOSE

1. SCOPE.

1.1. Scope. This document establishes a standard for threads, gaskets and rocker lugs for fire hose couplings, connections and fittings used by the USDA Forest Service in wildland firefighting. Thread series designations described in this standard are 3/4 inch 11-1/2 NH, 1 inch 11-1/2 NPSH, 1-1/2 inch 9 NH, 2-1/2 inch 7-1/2 NH, 2-1/2 inch 8 NPSH, and 4 inch 4 NH.

2. APPLICABLE DOCUMENTS.

2.1. Government Documents. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

Military Specification

MIL-A-8625 - Anodic Coatings for Aluminum and Aluminum-Alloys

Copies of military specifications are available from the General Services Administration, Federal Supply Service Bureau, Specification Section, Suite 200, 470 East L'Enfant Plaza SW, Washington DC 20407.

2.2. Non-Government Publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

Beneficial comments, recommendations, additions, deletions and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198 by using the Specification Comment Sheet at the end of this document or by letter.

American National Standards Institute (ANSI)/American Society for Quality Control (ASQC)

Z 1.4 - Sampling Procedures and Tables for Inspection by Attributes

Address requests for copies to the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.

American Society for Testing and Materials (ASTM)

D 412 - Test Method for Rubber Properties in Tension

D 2240 - Test Method of Test for Rubber Property - Durometer Hardness

E 380 - Practice for Use of the International System of Units

Address requests for copies to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Aluminum Companies of America(ALCOA) Specifications

226 - Aluminite Hard Coating

726 - Aluminite Hard Coating

Address requests for copies to ALCOA Technical Department, PO Box 132, Sidney, OH 45365.

2.3. Order of Precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS.

3.1. Construction.

3.1.1. Threads. Thread construction shall be as shown in Figure 1. Thread form dimensions shall be as indicated in Table 1. Internal and external thread dimensions shall be as indicated in Table 2. Dimensions of aluminum couplings, connections and fittings shall be measured after anodic hardcoating has been applied and finished.

3.1.1.1. Go-Not Go Gages. “Go” and “Not Go” gages shall be in conformance with the tolerances shown in Tables 3 and 4 and shall be used to verify conformity of fire hose connection and fitting threads to this standard. “Speed handles” or any device which provides mechanical advantage shall not be used on the thread gages. Gages shall not be forced once resistance is encountered.

3.1.1.1.1. Go Gages. For the “Go” gages, the gage shall rotate completely to the bottom of the threads without any resistance being felt.

3.1.1.1.2. Not Go Gages. For the “Not Go” gage, thread engagement shall not exceed 1.75 turns.

3.1.1.2. Blunt Start or Higbee. The outer ends of internal and external threads shall be terminated with the blunt or “Higbee Cut” on the full thread to avoid cross-threading and mutilation of threads. The minimum length of the blunt start shall not be less than the radius formed by a cutter with a radius not less than the height of the thread. The maximum length of the blunt start shall not be greater than 10 degrees of arc.

3.1.2. Gasket Recess. All internally threaded sections shall be provided with a gasket recess as shown in Figure 1 and the dimensions shall be as indicated in Table 1.

3.1.3. Gasket. All internally threaded couplings, connections and fittings shall be supplied with properly fitted gaskets meeting the dimensional requirements of Table 5 and material requirements of 3.2.1. All leakage requirements of referencing documents shall be met without repositioning or replacing the gasket.

3.1.4. Rocker Lug. Rocker lug construction shall be as shown in Figure 3 and shall have dimensions as indicated in Table 6. The rocker lug shall be an integral part of the internally threaded section and optional on the externally threaded section of a connection or fitting. A rocker lug on a 3/4 inch 11-1/2 NH coupling, connection or fitting is not required.

3.1.4.1. Higbee Indicator. The blunt start or Higbee cut on the rocker lug of an internally threaded connection or fitting shall be indicated by an indentation, Higbee indicator obvious to sight and touch, on the top of the rocker lug. A Higbee indicator of an externally threaded connection or fitting is optional.

3.2. Materials. Where more than one type of material is used in various components, there shall be no incompatibility between materials which may cause corrosion.

3.2.1. Gasket Material. Gasket material shall be rubber or other type elastomer intended for use in fire hose couplings, connections and fittings and shall meet the following physical property requirements.

a. Shore Type A durometer hardness of 70 ± 5 durometer, when tested in accordance with ASTM D 2240.
b. Minimum tensile strength shall be 1250 psig (8618 kPag) at 300 percent elongation, when tested in accordance with ASTM D 412.
c. Shore hardness shall not increase more than 10 durometer after aging for 96 hours in an oven at 158 ± 1.8 °F(70 ° ± 1 °C) and cooling to standard room temperature of 41.4 ± 3.6 °F (23 ± 2 °C), when tested in accordance with ASTM D 2240.

3.2.2. Tailpiece Gasket Material. Tailpiece gasket material shall be rubber or other type elastomer intended for use in fire hose couplings, connections and fittings and shall meet the hardness requirement of 60 ± 5 durometer, using a Shore Type A durometer.

3.2.3. Recovered Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR), provided all performance requirements of this specification are met.

3.3. Certificate of Conformance. Where certificates of conformance are required, the Government reserves the right to verify test any such items to determine the validity of certification.

3.3.1. Certification. The contractor shall provide certificates of conformance for all materials used in the manufacture of an item. The contractor shall provide the following information on certificates of conformance:

a. Manufacturer/Supplier's lot number
b. Quantity purchased
c. Purchase source, address, and telephone number
d. Purchase date

3.3.2. Test Results. The contractor shall provide copies of all test results for the Certificate of Conformance. Test results shall include:

a. Production Description
b. Manufacturer's name, address, and telephone number
c. Lot number
d. Date of manufacture
e. Test company name, address, and telephone number
f. Testing date
g. Specification, Standard or test method (include type, class, and form when applicable)
h. Test technician's name and title
i. All characteristic test values.

3.3.3. Gasket Material Conformance. For all first article testing, quality products list (QPL) testing, and on the first shipment of all lot-by-lot tested and QPL items, the contractor shall supply certificates of conformance for the gasket material based on testing from the sheet material from which the gasket was formed.

3.4. Markings. The fire hose connection or fitting shall be permanently and legibly marked, on the outside surface of the product, with the manufacturer's name or trademark, and the letters "FSS". The minimum letter height shall be 0.23 inch (3.05 mm). In addition, each threaded opening shall be similarly marked with the opening size and thread (for example: "1-1/2 NH"). Each threaded opening designation shall plainly indicate which opening is being referred to by its proximity or by other clearly understood means. Numerals such as 1/2 are to be considered three letters, "1", "/", and "2".

3.4.1. Marking Order. Markings on multiple threaded couplings shall be indicated with the internal thread first, then the external thread. Markings for a double internal or a double external threaded single piece shall be indicated with the smaller thread first, then the larger thread.

3.5. Surface Treatment. Aluminum-alloy thread surfaces, except still threads, shall be hard-coated to 0.002 inch (0.051 mm) thick and not vary more than ± 10 percent in accordance with MIL-A-8625, Type III, Class 1. ALCOA Aluminite Hard-Coating No. 226 or equal for forged or extruded (Rod) alloy or ALCOA Aluminite Hard-Coating No. 726 or equal for cast aluminum-alloy shall be applied.

3.5.1. Expanded Sections. If in the process of producing aluminum-alloy connections and fittings, it is necessary to expand an attaching body section onto a swivel, the bowl section need not be hard-coated: however, the entire swivel section, including still and screw threads, shall be hard-coated. After hardcoating, the threads may be coated with a permanent type lubricant to prevent galling of the threads.

3.6. Surface Finish. The finish shall be equal to the best commercial practices consistent with the highest engineering standards in the industry and shall be free from any finish defect which may impair serviceability or detract from the items appearance.

3.6.1. Cast Surface Finish. Exterior surfaces shall be smooth and cleaned by sandblasting, tumbling, or other accepted standard commercial process.

3.6.2. Forged and Extruded Surface Finish. Die-formed and machined surfaces, except threads, shall be smooth and have a roughness of not more than 125 μin (3.2 μm).

3.6.3. Plastic Surface Finish. Excessive material on edges shall not be allowed. All surfaces shall be free from laps, sharp die marks, cracks, flash, burrs, and sharp edges. The surface of the finished product shall be smooth and tack free.

3.7. Metric Products. Metric dimensions are provided for information only, inch-pound units shall be the required units of measure for this specification. Thread series designations are indicated as 1 inch 11-1/2 NPSH and 1-1/2 inch 9 NH, for example. Since these are thread series designations, not an indication of a specific dimension, the metric equivalent is not given. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of ASTM E 380, and all other requirements of this specification are met.

3.8. Dimensional Tolerance. Unless otherwise noted, the following tolerances apply:
one place (x.x) + / -0.1 inch (2.5 mm); two places (x.xx) + / -0.01 inch (0.25 mm) and three places (x.xxx) + / -0.010 inch (0.254 mm).

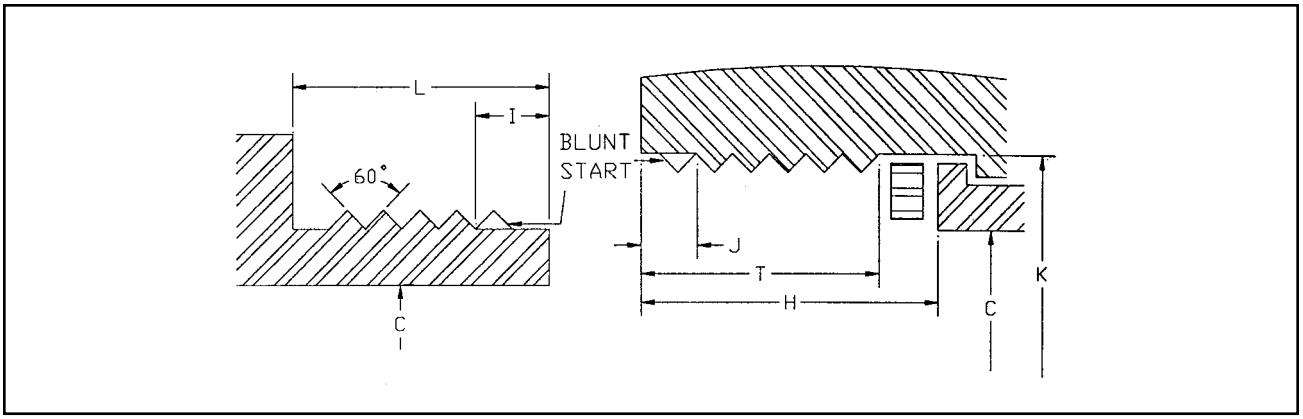

Figure 1. Thread and gasket recess configuration.

C = Diameter of the waterway
H = Depth of the coupling
I = Length of the pilot to the start of the second thread
J = Blunt start from the face to the start of the second thread
K = Diameter of the gasket seat
L = Length of the nipple
T = Length of the internal thread

Note for Figure 1. See Table 1 for associated dimensions.

Notes for Table 2 -

a. Dimensions given for the maximum minor diameter of the nipple are figured to the intersection of the worn tool arc with a centerline through crest and root. The minimum minor diameter of the nipple shall be that corresponding to a flat at the minor diameter of the minimum nipple equal to p/24, and may be determined by subtracting 11H/9 (or 0.7939p) from the minimum pitch diameter of the nipple.

b. Dimensions for the minimum major diameter of the swivel correspond to the basic flat (p/8), and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the swivel shall be that corresponding to a flat at the major diameter of the maximum swivel equal to p/24, and may be determined by adding 11H/9 (or 0.7939p) to the maximum pitch diameter of the swivel.

Table 5. Gasket Dimensions

Nominal Waterway Size inch (mm)	Inner Diameter A inch (mm)	Outer Diameter B Tolerance +0 / -0.03 in (0.79mm) inch (mm)	Thickness C inch (mm)
3/4 (19.1)	0.81 (20.57)	1.44 (36.58)	0.13 (3.30)
1 (25.4)	1.06 (26.92)	1.44 (36.58)	0.13 (3.30)
1-1/2 (38.1)	1.56 (39.62)	2.06 (52.32)	0.13 (3.30)
2-1/2 (63.5)	2.56 (65.02)	3.19 (81.03)	0.19 (4.83)
4 (101.6)	4.06 (103.1)	5.13 (130.3)	0.25 (6.35)

The dimensional tolerance is ± 0.03 inch (± 0.79 mm).

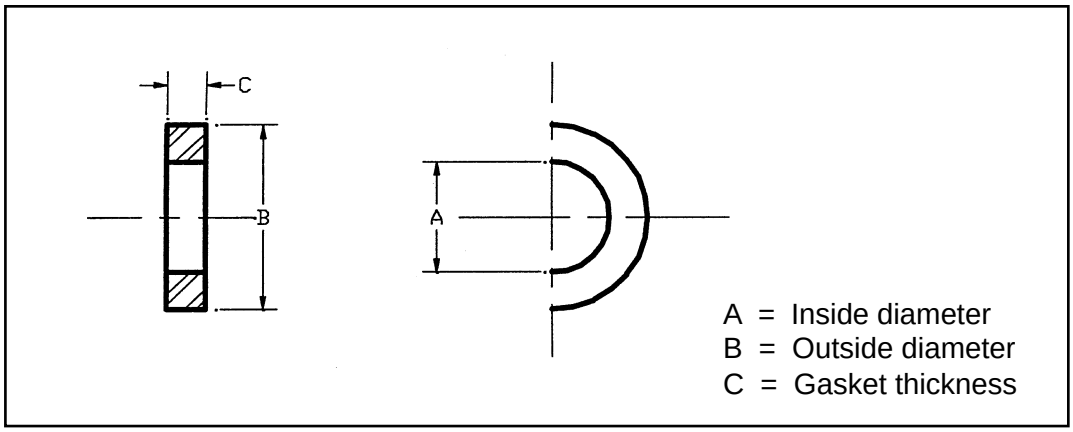

Figure 2. Gasket configuration.

Table 6. Rocker Lug Dimensions

Nominal Fitting Size inch (mm)		L inch (mm)	W inch (mm)	T inch (mm)	H inch mm)	A inch (mm)	B inch (mm)	C inch (mm)	No. Lugs
1 (25.4)	Maximum	—	0.44 (11.2)	0.31 (7.9)	0.38 (9.7)	0.13 (3.3)	—	—	2 or 3
	Minimum	0.69 (17.5)	0.25 (6.4)	0.13 (3.3)	0.25 (6.4)	0.06 (1.5)	0.19 (4.8)	0.44 (11.2)	
1-1/2 (38.1)	Maximum		0.44 (11.2)	0.31 (7.9)	0.38 (9.7)	0.13 (3.3)	—	—	2 or 3
	Minimum	0.69 (17.5)	0.25 (6.4)	0.13 (3.3)	0.25 (6.4)	0.06 (1.5)	0.19 (4.8)	0.44 (11.2)	
2-1/2 (63.5)	Maximum	—	0.69 (17.5)	0.5 (12.7)	0.44 (11.2)	0.13 (3.3)	—	—	2 or 3
	Minimum	1.0 (25.4)	0.56 (14.2)	0.25 (6.4)	0.31 (7.9)	0.06 (1.5)	0.5 (12.7)	0.69 (17.5)	
4 (101.6)	Maximum	—	0.69 (17.5)	0.5 (12.7)	0.44 (11.2)	0.13 (3.3)	—	—	2 or 3
	Minimum	1.0 (25.4)	0.56 (14.2)	0.25 (6.4)	0.31 (7.9)	0.06 (1.5)	0.5 (12.7)	0.69 (17.5)	

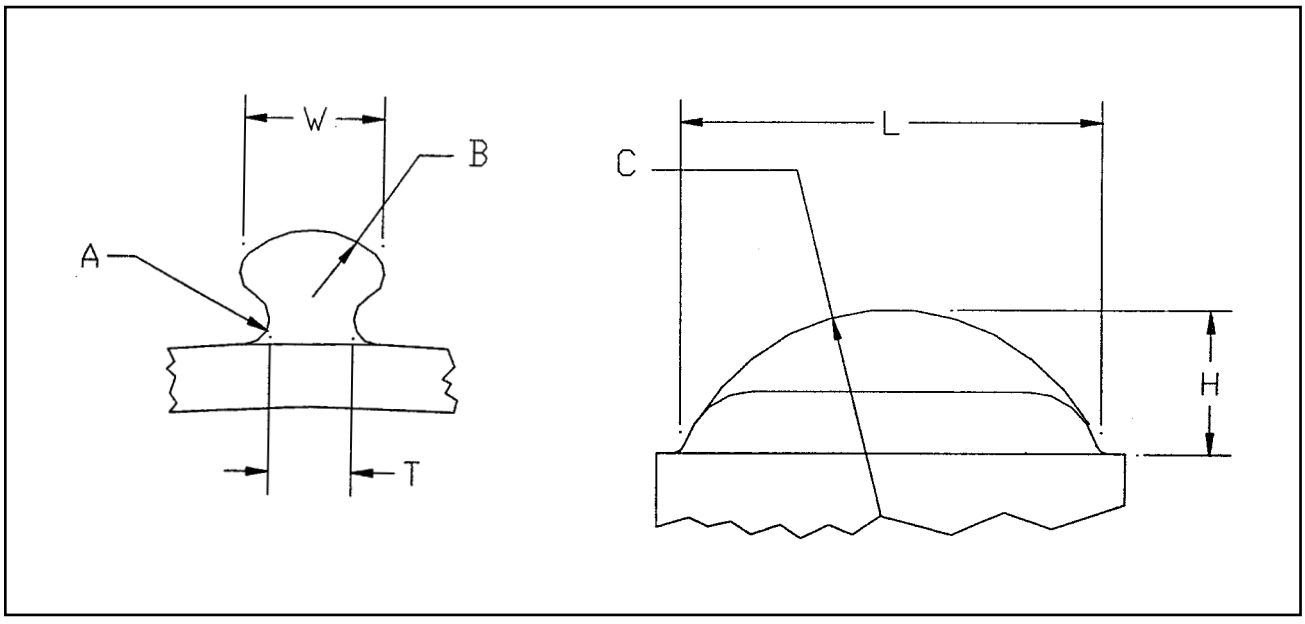

Figure 3. Rocker lug configuration.

4. NOTES.

4.1. Intended Use. This document establishes a standard for threads, gaskets and rocker lugs for fire hose couplings, connections and fittings used by the USDA Forest Service in wildland firefighting.

4.2. Notice. When Government drawings, specification, or other data are used for any purpose other than in connection with a related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

4.3. Preparing Activity. USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.

United States Department of Agriculture, Forest Service
Standardization Document Improvement Proposal

Instructions: This form is provided to solicit beneficial comments which may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, or other prospective users of this document are invited to submit comments to the USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, California 91773-3198. Attach any pertinent data which may be of use in improving this document. If there is additional documentation, attach it to the form and place both in an envelope addressed to the preparing activity. A response will be provided when a name and address are included.
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Standard Number and Title: **Specification 5100-190b, Threads, Gaskets, Rocker Lugs, Connections and Fittings, Fire Hose.**

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